

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_668_19

Comparison of readiness for e-learning from the perspective of students and professors of Medical Sciences

Parisa Mokaripour, Nasrin Shokrpour, Leila Bazrafkan¹

Abstract:

INTRODUCTION: The aim of this study was to evaluate the cognitive, psychomotor, and attitudinal readiness of faculty members and students of Shiraz University of Medical Sciences for using e-learning in 2019 in order to move toward the desired future of e-learning in medical education, promote the benefits of e-learning in the country, and provide training to each of the research groups if needed.

METHODS: This is a cross-sectional study conducted in Shiraz University of Medical Sciences, Iran, in 2019. The study population consisted of 379 students and 281 professors selected through the systematic random sampling in Shiraz University of Medical Sciences. The e-learning readiness questionnaire developed by Zarif Sanaei *et al.* was used to evaluate the students' and teachers' viewpoints.

RESULTS: The results showed that the average level of skill, knowledge, and attitude among students and teachers was positive and higher than the mean ($P < 0.05$). It had only a significant relationship in the level of education of the teachers and the marital status of the participants. There was also a significant interaction between skill, knowledge, and attitude.

CONCLUSION: There is a need for successful implementation of e-learning by creating appropriate infrastructure, applying the required standards, as well as taking measures to reduce the existing resistance in this regard, which can be achieved through training workshops. The experience of successful universities in the country and abroad can also be used to implement e-learning.

Keywords:

E-learning, learning, preparedness, professors, students

Introduction

Preparation for unpredictable future events requires technology, and information and communication technology (ICT) has significant effects on university policies and national policymaking.^[1] The emergence and development of ICT and its application in education systems have given rise to a new wave of evolution in the world's educational systems; this has pushed the current learning systems toward e-learning and made it an important teaching tool.^[2] The term e-learning was first coined by Cross,

referring to the types of training that use the Internet and Intranet technologies to learn.^[3] This term is one of the mostly discussed learning environments in the information age. Therefore, the efforts and experiences related to this type of learning have received much attention worldwide.^[4] The use of e-learning has now led to major changes in the educational processes of universities and other higher educational institutions because this approach to education has eliminated the geographical constraints by using the current technological tools such as the web and networking, and there is no need for the physical presence of the professor and conventional scheduling

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Mokaripour P, Shokrpour N, Bazrafkan L. Comparison of readiness for e-learning from the perspective of students and professors of Medical Sciences. *J Edu Health Promot* 2020;9:111.

Education Development Center, Clinical Education Center, Shiraz University of Medical Sciences, Shiraz, Iran, ¹Clinical Education Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

Address for correspondence:

Dr. Leila Bazrafkan, Education Development Center, Clinical Education Research Center, Shiraz University of Medical Sciences, Shiraz, Iran. E-mail: bazrafcan@gmail.com

Received: 01-12-2019
Accepted: 04-02-2020
Published: 28-05-2020

of traditional classes.^[5] E-learning can provide the students with a variety of curricula with different styles, so that students themselves can shape their learning according to different styles.^[6,7] On the other hand, in macro-planning for student education, time and distance have greatly complicated the design and implementation of a traditional system that operates cost-effectively. E-learning will be a very unique feature in distance learning and solving this problem.^[8] This type of training can include instructional content and adaptive tutorials, audiovisual clips, and web-based seminar posts to virtual models, and can be used by professionals to enhance the effectiveness of educational interventions against the academic and social learning challenges. In fact, the web potentially provides the opportunity for learning to update course contents dynamically and always accessible to users.^[9] Parkes *et al.*'s (2014) study showed that e-learning self-efficacy is the most important construct, and the technology acceptance model has a good potential in the academic environment.^[10] In their research entitled "Students' Readiness for E-Learning Environments," Park *et al.* (2009) indicated that while the students were ready to use technology and the Internet such as using search engines and downloading and uploading resources, in practice, they were not familiar enough with activities such as reading and writing on a regular level, identifying electronic tools for doing homework, providing clear and concise answers to online conversations, reasoning, and interacting with other students.^[11] In their study entitled "Evaluating Students' Viewpoints to E-Learning: A Case Study of Engineering Students in Libya," Rahima *et al.* (2014) examined the attitudes and beliefs of engineering students toward e-learning in two Libyan universities. The results showed a positive attitude of students toward information and communication technology (ICT) and e-learning. They had the self-confidence to use computers, and were interested in using courses that use e-learning. In particular, students believed that e-learning would give them a chance to enhance their new knowledge and learning experience. In fact, expanding e-learning effectively in the country will not be successful while disregarding the educational needs, existing contexts, required infrastructure and facilities, knowledge and attitude of user staff, professors and students, resistance of educational organizations to changes, and eventually the challenges confronting e-learning. The challenges facing this type of education in the country and the inadequacy of the developmental models applied have made the need for comprehensive e-learning research in medical education in Iran inevitable. Considering the interests of university officials and even managers of noneducational departments and organizations in applying virtual teaching methods, it is expected that in the coming years, most academic units in Iran will attract and educate students electronically and utilize virtual

education on a very broad level;^[12] therefore, medical education professionals in Iran need to make efforts to use e-learning in this sense, using related studies and research. In this study, the cognitive, psychomotor, and attitudinal readiness of professors and students for e-learning was investigated in order to move toward the desired future of e-learning in medical education, promote the benefits of e-learning in the country, and provide training to each of the research groups if required.

Some studies have been conducted in this field, but the present study was conducted in Shiraz University of Medical Sciences, as one of the main centers in e-learning education in our country, and it seems that the academic staff and students here are more prepared for the application of e-learning in educational programs. It is recommended that further studies be conducted on the students and academic staff's preparedness for expansion of e-learning in future programs.

Materials and Methods

This study was conducted following a descriptive-correlational study design. The statistical population consisted of professors and students of Shiraz University of Medical Sciences. Given that the number of university students in 2018–2019 was about 11,400 and the number of university professors was 1015, and according to the Cochran's sample size formula, the number of samples, with 0.05 error coefficient, for students and professors, was 379 and 281, respectively, which was determined by proportional stratified random sampling according to the ratio of faculty members and students in each field.

Setting

This study was conducted at Shiraz University of Medical Sciences, one of the mother and type-one universities in Iran. The university's history of e-learning goes back two decades, and it is now the center of e-learning in the south of the country. The faculties studied included Fatemeh Medical, Health, Paramedical, Nursing and Midwifery, Nutrition and Food Sciences, Dentistry, Pharmacy, Virtual College, Rehabilitation Sciences, Modern Medical Sciences and Technologies, and Management and Information.

Study tools

A questionnaire containing 38 questions previously designed by Zarif Sanaei *et al.* was used in this study. The validity and reliability of the questionnaire were confirmed.^[13] The reliability of Cronbach's alpha for the whole scale was calculated as $\alpha = 0.75$. The first part of the questionnaire included background questions (questions 1–9), such as the name of the

faculty, age, gender, work experience, field of study and degree, the name of the university, employment status, marital status, and location. The second part included specific questions, including 6 questions on how to access computer and the Internet, 12 questions on computer skills with Likert scale (full mastery [3], partial mastery [2], and no mastery [1]), 10 questions about e-learning knowledge (Likert scale: true [3], don't know [2], and false [1]), and 10 questions about the attitudes toward e-learning (Likert scale including strongly agree [5], agree [4], no idea [3], disagree [2], and strongly disagree [1]).

To ensure the face and content validity of the questions, the opinions of several professors who were specialized in the field were used in this study. The reliability of the questionnaire was confirmed by Cronbach's alpha coefficient ($\alpha = 0.85$). Data were collected by a researcher using a questionnaire through conducting fieldwork on university campus.

Data analysis

In order to analyze the data, we used SPSS version 21 (SPSS Inc., Chicago, IL, USA). We also used descriptive statistics such as central and dispersion indices and tables to describe the data and inferential statistics such as parametric tests, comparison of independent means, one-way ANOVA, and Pearson's correlation after assuring that the data were normal.

Ethical considerations

This study was registered at the University Ethics Committee under the research project number 18827. After ensuring the validity and reliability of the tools and ethical considerations, including permission to conduct the research from Shiraz University of Medical Sciences, informed consent from the research participants to participate in the study, confidentiality of names, and availability of the researcher to answer the questions, the questionnaires were distributed among the students and professors.

Results

Independent *t*-test results showed that there was a statistically significant difference in the mean score of computer skills between the students (1.82 ± 0.29) and professors (1.89 ± 0.52) ($P < 0.05$), so that the mean score of the teachers was higher than that of the students. In addition, the results of statistical test showed that there was a statistically significant difference in the mean score of computer skills in professors, in terms of the level of education ($P < 0.05$). According to the *post hoc* test, the mean computer skills in the professors with master's degree (MSc) (2.07 ± 0.42) were higher than professors with PhD (1.72 ± 0.43). In addition, according to the

results, there was no statistically significant difference in computer skills between the students and professors in terms of gender, marital status, semester, Students' education, Students' place of residence (location), and professors' work experience ($P > 0.05$).

The results of independent *t*-test showed that there was a statistically significant difference in the overall mean score of the participants' e-learning knowledge between the students (2.23 ± 0.18) and professors (2.15 ± 0.23) ($P < 0.05$), so that the mean score of the students' knowledge was higher than that of the professors. The results of statistical test also showed that there was a significant relationship between the mean score of the participants' knowledge and total mean score, in terms of marital status, so that the mean score of single participants (2.22 ± 0.18) was higher than that of other categories. The results also showed that there was a statistically significant difference in the e-learning knowledge of professors, in terms of the level of education ($P < 0.05$). According to the *post hoc* test, the mean score of e-learning knowledge in professors having MSc degree (2.30 ± 0.19) was higher than that of the professors with MD (2.16 ± 0.20) and PhD degree (2.07 ± 0.20); similarly, professors with MD degree had a higher mean score of knowledge than those having a PhD degree. Furthermore, based on the results, there was no statistically significant difference in e-learning knowledge between the students and professors in terms of gender, semester, students' education, students' place of residence, and professors' work experience ($P > 0.05$) [Table 1].

The results of independent *t*-test showed that there was a statistically significant difference in the overall mean score of the participants' attitude toward e-learning between the students (3.65 ± 0.48) and lecturers (3.49 ± 0.39) ($P < 0.05$), so that the mean score of the students' attitude was higher than that of the professors. The results of statistical test also showed that there was a significant relationship between the mean score of the participants' attitude toward e-learning and total mean score, in terms of marital status, i.e., the mean score of single participants (3.63 ± 0.50) was higher than that of other categories. The results also showed that there was a statistically significant difference in the attitude of professors as to the level of education ($P < 0.05$). According to the *post hoc* test, the mean score of attitude toward e-learning in professors with MSc (3.66 ± 0.30) was higher than those with MD degree (3.48 ± 0.23) and PhD (3.39 ± 0.24) [Table 2].

The results also showed that there was a significant relationship between attitude toward e-learning and location among the students; the students living in Shiraz had a higher attitude mean score than those residing in

dormitories. Furthermore, based on the results, there was no statistically significant difference in the attitude toward e-learning between the students and professors in terms of gender, semester, students' education, and professors' work experience ($P > 0.05$) [Table 2].

Results of the investigation of the relationship between the mean scores of computer skills, e-learning knowledge, and attitude toward e-learning in terms of computer access and internet access by faculty members and students participating in the study showed that there was no statistically significant relationship between any of the dimensions and accessibility ($P > 0.05$).

Results of investigating the relationship between the mean scores of computer skills, e-learning knowledge, and attitude toward e-learning in terms of the training received showed that the knowledge of professors who received the training was higher than that of the other professors. This difference was significant, but there was no statistically significant relationship between other dimensions ($P > 0.05$). In addition, Pearson's correlation coefficient test results showed that there was a mutual significant relationship among computer skills, e-learning knowledge, and attitude toward e-learning [Table 3].

Discussion

The purpose of this study was to prepare the students and professors of Shiraz University of Medical Sciences for using e-learning in 2019. The results showed that as to the skills required for the use of e-learning system, most of the respondents had partial mastery of working with the computer system, and most of the problems they had were associated with fixing the system hardware and protecting against viruses and hackers. In their research, Parkes *et al.* also stated that while students were ready to use technology and the Internet, such as using search engines and downloading and uploading resources, they were, in fact, not familiar enough with activities such as reading and writing on a regular level, identifying electronic tools for doing homework, providing clear and concise answers to online conversations, reasoning, and interacting with other students.^[10] The difference between these two studies is due to the differences in the research community and environment and differences in the type of skill assessment and designed questions. Ruiz *et al.* also have indicated in their research that a developing infrastructure to support e-learning in medical education includes digital libraries to manage access to e-learning materials.^[14] However, the present study showed that only about 3% of students and about 16% of professors had full mastery of databases and digital libraries. Although more than half of the professors stated that they had partial mastery,

Table 1: Comparison of the overall mean scores of the participants' e-learning knowledge in terms of research variables using t-test and ANOVA

Variable	Grouping	Mean±SD	Test results
Participants	Student	2.23±0.18	$P < 0.001$, $t = 4.77$
	Professor	2.15±0.23	
Gender	Female	2.24±0.19	$P = 0.157$, $t = 2.65$
	Male	2.15±0.21	
Location	Home	2.20±0.21	$P = 0.511$, $t = 0.66$
	Dormitory	2.21±0.18	
Marital status	Married	2.18±0.22	$P = 0.026$, $F = 3.67$
	Single	2.22±0.18	
	Others	2.20±0.27	
Education	BSc	2.23±0.18	$P < 0.001$, $F = 28.97$
	MSc	2.28±0.19	
	Professional doctorate	2.22±0.18	
	PhD	2.09±0.20	
Employment status	Faculty member	2.15±0.01	$P = 0.444$, $t = 0.767$
	Nonfaculty member	2.10±0.10	
Work experience (years)	1-5	2.01±0.13	$P = 0.116$, $F = 2.171$
	6-15	2.15±0.22	
	16-30	2.17±0.23	
Semester	Semesters 1 and 2	2.24±0.16	$P = 0.553$, $t = 0.593$
	Semester 3 and semesters above it	2.23±0.20	

SD=Standard deviation

Table 2: Comparison of the overall mean score of the participants' attitude toward e-learning in terms of research variables using t-test and ANOVA

Variable	Grouping	Mean±SD	Test results
Participants	Student	3.65±0.48	$P < 0.001$, $t = 4.77$
	Professor	3.49±0.39	
Gender	Female	3.57±0.42	$P = 0.513$, $t = 0.655$
	Male	3.59±0.48	
Location	Home	3.60±0.46	$P = 0.030$, $t = 2.17$
	Dormitory	3.51±0.41	
Marital status	Married	3.54±0.41	$P = 0.021$, $F = 30.894$
	Single	3.63±0.50	
	Others	3.43±0.37	
Education	BSc	3.64±0.54	$P < 0.001$, $F = 10.54$
	MSc	3.70±0.36	
	Professional doctorate	3.60±0.43	
	PhD	3.43±0.43	
Employment status	Faculty member	3.48±0.02	$P = 0.074$, $t = 1.798$
	Nonfaculty member	3.73±0.11	
Work experience (years)	1-5	3.45±0.39	$P = 0.892$, $F = 0.115$
	6-15	3.48±0.37	
	16-30	3.50±0.42	
Semester	Semesters 1 and 2	3.67±0.55	$P = 0.383$, $t = 0.874$
	Semester 3 and semesters above semester 3	3.63±0.41	

SD=Standard deviation

it seems that the necessary training should be provided in this regard, and that the importance of the subject should be pointed out in order to improve the individuals'

Table 3: Correlation coefficient matrix of the components of the professors and students' viewpoints to e-learning

Research dimensions	1	2	3
Computer skills	1		
E-learning knowledge	0.145**	1	

**The significance level is less than 0.05

level of knowledge in this field. This is a crucial role because without a combination of teachers' skill, knowledge, and experience in this regard, it is unlikely to have a coherent system to help the students to better achieve their goals.^[15] The results of the present study also suggest that e-learning provides more opportunities for teachers to develop and update their information, which is consistent with Ruiz *et al.*'s study.^[14] Therefore, the integration of e-learning with traditional education can provide effective opportunities for teachers. The results also showed that e-learning eliminated the opportunity for interaction. According to the respondents' viewpoints, the task of a learner in distance learning is interaction with the content, and through such interaction, the teacher and other learners must assume responsibility for their own learning and transfer all their knowledge to the learner. This finding is consistent with the findings of Violante and Vezzetti's study.^[16] The results of the present study showed that students' attitude toward e-learning was positive and higher than the mean, which is in line with Rhema *et al.*'s research.^[12] They stated that students had the self-confidence to use computers, and were interested in using courses that use e-learning. Based on the results, it seems that e-learning can be used as a new opportunity for learning and as a tool to enhance the quality of education. Wilson *et al.* also argued that e-learning is a major challenge in most electronic communication tools due to reducing face-to-face communication and lack of understanding of different individual states.^[17] However, Zulfaqari *et al.* stated that students and professors were completely satisfied with the use of e-learning and preferred this type of education over traditional education.^[18] This discrepancy can be due to differences in the research community and the teaching methods applied by universities. The results of the present study showed that more than half of the respondents disagreed that e-learning enhanced their abilities, and only about 20% believed that it could enhance their abilities. This may be due to the inadequacy of the existing electronic systems or the lack of understanding of the research question. In the present study, students and professors had a positive attitude toward e-learning, and the mean score of the students' attitudes was higher than that of professors, which may be due to the ease of using e-learning for students or their greater use of online and online systems. In their research, Naqavi *et al.* showed that professors had a positive attitude toward e-learning

as a teaching aid tool. In this regard, the teachers' sense of usefulness and self-efficacy was the most important factor in their willingness to use e-learning.^[19] Despite the higher attitude mean score of the students toward e-learning than professors, the results showed that professors were more proficient than the students. The difference in the results could be due to the professors' high usage of e-learning in teaching and learning than students who spend most of their time on virtual entertainment. However, the majority of the internet users, whether students or professors, spend most of their time on virtual entertainment. This is a cause for concern and a departure from the goals of convenient internet access. The results show that e-learning provides learning opportunities, disregarding the time and space to learners, which is consistent with the research of Wilson *et al.*^[17] It can provide conditions for people in specific situations to provide or receive the necessary training. Given that all the researchers stated that they had access to mobile Internet and that they all had access to the Internet and computer at school and at work, as well as considering the fact that most participants stated that they used the Internet in both languages, the use of online training becomes possible more than ever, and it provides an appropriate opportunity to make the most use of these facilities for scientific and academic purposes. In this study, only a small percentage stated that training costs for e-courses were higher than that of traditional training, and the majority disagreed about it. This finding is consistent with those of Barbour,^[20] who believed that all virtual training courses were less expensive than traditional education. It is also in line with the results of Khoshrang *et al.*, who described cost-effectiveness as one of the benefits of e-learning.^[21] In the present study, the average level of skill, knowledge, and attitude of professors and students was reported above the mean, whereas studies on e-learning readiness such as Dalili Saleh *et al.*'s study^[22] indicate that organizations are not prepared for entering the field of e-learning. According to the results of this study, the level of skill, knowledge, and attitude of professors with MSc was significantly higher than that of professors with other levels of education, while these differences were not significant among the students; however, the level of skill and knowledge of postgraduate students was higher than that of other students with other levels of education. It is not consistent with the results of Dalili Saleh *et al.*'s study.^[22] Differences in the results may be due to the differences in research time and changes in postgraduate education systems. There may also be differences between professors due to the nature of the different faculties and the degree of faculty members and the need to use electronic methods and tools. The results of the present study showed that there was a significant relationship between the mean score of the participants' attitude and the total mean score, in terms

of marital status, such that the mean score of single participants was higher than that of other categories. This finding has not been found in other studies. The results also showed that students living in Shiraz had a higher average attitude toward e-learning than those living in dormitories, which could be due to the duration or ease of use of personal computers. In the present study, the mean of students' skills, knowledge, and attitudes in terms of demographic characteristics was not significant, which is consistent with the results of Jafari *et al.*'s study,^[23] but it is not in the same line with the research of Latifnejad Roudsari *et al.*^[24] These differences can be seen as strength in providing the same training to different groups to enhance the motivation and preparedness of individuals. The results of computer and internet access showed that students and professors had complete access to the Internet and computers at school and at work. However, there was no significant relationship among the mean scores of computer skills, e-learning knowledge, and attitude toward e-learning in terms of how to access computer and the Internet at students' home or dormitory. It was also shown that the mean score of skill, e-learning knowledge, and attitude toward e-learning, based on the received instruction, was higher in professors who received the relevant training than that of professors with other levels of education.

Implications

Based on the results, it seems that virtual education alone cannot satisfy the audience, and these types of training should be a combination of both in-person and non-in-person training. This type of education has not yet gained its place in education due to some restrictions, reluctance, lack of knowledge of functions, lack of education in all faculties and different sections, or inadequate infrastructure. Lack of production of strong contents and accurate evaluation systems can be one of the other problems of this education system. However, we believe that this type of training is an effective step in the education system of the country, and if necessary, measures can be taken to ensure its effective delivery, which can provide greater satisfaction for the learners. Therefore, it is recommended that measures be taken to improve students' readiness for participation in these courses and increase their motivation as well, so that in the case of the establishment of the educational system, students can make the best use of online and distance learning classrooms, teachers can be provided with the ease and readiness to use this type of education, and they can both be encouraged to apply such an educational approach. To maximize the effectiveness, the authorities should use the experiences of successful countries in this area, and the most appropriate approach should be selected and implemented. Therefore, the authorities are suggested to:

1. Use the experiences of successful countries and choose the most appropriate method for implementation
2. Improve the preparedness of professors and students to acquire the necessary skills and ultimately increase self-confidence in applying appropriate e-learning methods
3. Establish the necessary infrastructure at the least cost to encourage the individuals and eliminate the existing constraints
4. Take some measures to increase the knowledge and motivation of students and emphasize this approach to teaching for faculty members and lecturers.

The results of this study can be used to further evaluate the acceptance of information technology in Shiraz University of Medical Sciences. Therefore, planners and policymakers of higher education system need to pay more attention to the provision of appropriate infrastructure to promote e-learning.

Research limitations

The main limitation of this study was that it was conducted only on the professors and students of Shiraz University of Medical Sciences, and its results cannot be generalized to other classes of higher education. Therefore, it is necessary to conduct further studies on other students of other universities in order to obtain a better assessment of the subject of this research. The other limitation of the study was the lack of cooperation of a number of samples in responding to the questionnaires.

Conclusion

Given the advances in the modern era and the inevitable use of e-learning approach in the delivery of courses, especially in the field of medical sciences, it is recommended that some measures be taken consistent with the macro-policies of Shiraz University of Medical Sciences in the following areas: dissemination of new teaching methods and optimum use of new educational technologies with a thoughtful planning for laying the groundwork for applying new educational technologies and providing motivation to faculty members and students in the use of e-learning in the university. It is also suggested that research projects be designed and carried out to better understand the problems of using e-learning system at Shiraz University of Medical Sciences.

Acknowledgments

This article is the result of the research project extracted from the thesis of Parisa Mokaripour with the code no. of 18827. We acknowledge the Education Development Center, faculty members, students, and the study participants, who helped us to perform the study.

Financial support and sponsorship

The present article was extracted from the thesis written by Parisa Mokaripour and has been registered by Shiraz University of Medical Sciences (no. 97-01-01-18827).

Conflicts of interest

There are no conflicts of interest.

References

1. Dana A, Hatami J, Maleki M. Evaluation of the quality of provided instruction in e-learning center of Tarbiat Modares University (TMU) from students' and educational experts' point of view. *Q J Iran Distance Educ* 2018;1:29-38.
2. Alhabeeb A, Rowley J. E-learning critical success factors: Comparing perspectives from academic staff and students. *Comput Educ* 2018;1:1-2.
3. Akbarilakeh M, Razzaghi A, Moghaddam HD. Attitudes of faculty members towards using e-learning. *Res Dev Med Educ* 2019;8:12-9.
4. Yazdan-Panah A. Competitive Explanation and Evaluation of Virtual Universities. *J Strateg Manage Stud* 2012;12:101-22.
5. Bordbar A, Naghi Zade M, Zargardi B, Laghaei T. Review and prioritize the effective factors in the successful implementation of e-learning faculty members Fasa University of Medical Sciences, Horizon. *J Med Educ Dev* 2010;4:47-54.
6. Proceedings of the Seventh EDEN (European Distance Education Network) Annual Conference 1998;2:225-9.
7. Truong HM. Integrating learning styles and adaptive e-learning system: Current developments, problems and opportunities. *Comput Hum Behav* 2016;55:1185-93.
8. Vanslambrouck S, Zhu C, Pynoo B, Lombaerts K, Tondeur J, Scherer R. A latent profile analysis of adult students' online self-regulation in blended learning environments. *Comput Hum Behav* 2019;99:126-36.
9. Arkorful V, Abaidoo N. The role of e-learning, advantages and disadvantages of its adoption in higher education. *Int J Instr Technol Distance Learn* 2015;12:29-42.
10. Mitchell P, Sarah S. Reading, Christine. Student preparedness for university e-learning environments. *Internet Higher Educ* 2015;25:1-10.
11. Park SY. An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Educ Technol Soc* 2009;12:150-62.
12. Amal R, Iwona M. Analysis of student attitudes towards e-learning: The case of engineering students in Libya. *Issues Inf Sci Inf Technol* 2014;11:169-90.
13. Zarifsanaiey N, Mehrabi M. Development of the academics' e-readiness questionnaire (ARQ) for medical universities, Turkish. *Online J Distance Educ* 2019;20:77-88.
14. Ruiz JG, Mintzer MJ, Leipzig RM. The impact of e-learning in medical education. *Acad Med* 2006;81:207-12.
15. Hekmatzadeh MH, Khojasteh L, Shokrpour N. Are emotionally intelligent EFL teachers more satisfied professionally? *Int J Appl Linguist Eng Lit* 2016;5:97-106.
16. Violante MG, Vezzetti E. Virtual interactive e-learning application: An evaluation of the student satisfaction. *Comput Appl Eng Educ* 2015;23:72-91.
17. Wilson RC, Gaff JG, Diensky ER, Wood L, Bavry JL. *College Professors and Their Impact on Students*. New York: Wiley and Sons; 1975.
18. Zolfagari M, Nagarandeh R, Ahmadi F. The efficacy of blended e learning in education. *Educ Med Sci* 2010;10:398-409.
19. Naghavi MA. Study of teachers and students' attitude toward e-learning: Surveying in Iran's e-learning universities. *J Res Plan High Educ* 2007;13:157-76.
20. Barbour MK. Virtual schools are more cost-effective compared to traditional, brick-and-mortar schools? In K. P. Brady (Ed.), *Technology in Schools: Debating Issues in American Education*. Thousand Oaks, CA: Sage; [In press].
21. Khoshrang H, Dadgaran I, Shaigan H. Designing a questionnaire to measure threats and opportunities of e-learning and determining its psychometric properties. *Interdiscip J Virtual Learn Med Sci* 2014;5:1-10.
22. Dalili Saleh M, Hasannezhad F, Tabaraei Y. E-learning readiness assessment among students in Sabzevar University of Medical Science. *Journal of Sabzevar University of Medical Sciences* 2018;25, #M00317:429-40. Available from: www.sid.ir/en/journal/viewpapers.aspx?ID=604474. [Last accessed on 2020 Apr 20].
23. Jafari H, Azmoude E, Ahour M. Studying the knowledge and attitude of students of Torbat Heydariyeh University of Medical Sciences toward e-learning. *J Torbat Heydariyeh Uni Med Sci* 2018;6:38-47.
24. Latifnejad Roudsari R, Jafari H, Hosseini BL, Esfalani A. Measuring students' knowledge and attitude towards e-learning in Mashhad University of Medical Sciences (MUMS). *Iran J Med Educ* 2011;10:364-73.